

# **Pre-Inspection Checklist For Hot Water Heating or Hot Water Supply Boilers**

Spring 2003

**Notice:** This checklist reflects the most common violations our field inspectors encounter when performing an inspection on a hot water heating boiler installation. It's suggested that boiler industry personnel have access to a current set of applicable codebooks/jurisdictional laws. Such as: **Section IV of the ASME Boiler Code, The National Board Inspection Code (NBIC): Chapter 296-104 WAC**, and Chapter **70.79 RCW** of The Washington Boiler and Unfired Pressure Vessel Laws.

## **Administration and General Requirements**

- Every contractor shall be registered with the Department of Labor and Industries before installing/reinstalling, making repairs, or modifications to any boiler. See [RCW 18.27](#) and [18.106](#)
- Every contractor shall apply for and obtain a permit from the boiler section prior to making the installation or reinstallation of any boiler. See [WAC 296-104-020](#)
- A minimum clear space of eighteen inches (18") shall be provided on all sides of the boiler. As a minimum all other sides shall comply with the boiler manufacturer's installation instructions for clearances to combustible materials. See [WAC 296-104-255](#), [260](#), [265](#), and [271](#)
- The owner or user of any boiler required to be inspected upon installation/reinstallation shall not operate the boiler until a certificate-inspection has been made. See [RCW 70.79.320](#)
- All hot water heating or hot water supply boilers shall be constructed, stamped, and installed in accordance with Section IV of the ASME code. See [WAC 296-104-200](#)
- All hot water heating or hot water supply boilers shall comply with the requirements of ASME CSD-1 (Part CF). See [WAC 296-104-200](#)

## **Instruments, Fittings, and Controls**

- Each hot water heating or hot water supply boiler shall have a pressure or altitude gage connected to it or its flow connection. See Section IV HG-611
- The scale on the dial of the pressure or altitude gage shall be graduated approximately to not less than 1 ½ nor more than 3 ½ times the pressure at which the safety relief valve is set. See Section IV HG-611
- Piping or tubing for pressure or altitude gage connections shall be of nonferrous metal when smaller than NPS 1 inch. See Section IV HG-611
- Each hot water heating or hot water supply boiler shall have a thermometer so located and connected that it shall be easily readable. The thermometer

shall be so located that it shall at all times indicate the temperature of the water in the boiler at or near the outlet. See Section IV HG-612

- Each automatically hot water heating or hot water supply boiler shall be protected from over-temperature by two temperature-operated controls. See Section IV HG-613
- Each individual automatically hot water heating or hot water supply boiler shall have a high temperature limit control that will cut off the fuel supply to prevent the water temperature from exceeding its marked maximum water temperature at the boiler outlet. This control shall be constructed to prevent a temperature setting above the maximum. See Section IV HG-613
- Each individual automatically hot water heating or hot water supply boiler or each system of commonly connected boilers without intervening valves shall have a control that will cut off the fuel supply when the system water temperature reaches a preset operating temperature, which shall be less than the maximum water temperature. See Section IV HG-613
- Each automatically fired hot water boiler with heat input greater than 400,000 Btu/hr shall have an automatic low-water fuel cutoff that has been designed for hot water service, and it shall be so located as to automatically cut off the fuel supply when the surface of the water falls to the lowest safe permissible water level established by the boiler manufacturer. See Section IV HG-614
- A coil-type boiler or a watertube boiler with heat input greater than 400,000 Btu/hr requiring forced circulation to prevent overheating of the coils or tubes shall have a flow-sensing device installed in lieu of a low-water fuel cutoff to automatically cut off the fuel supply when the circulating flow is interrupted. See Section IV HG-614

### **Installation Requirements**

- Safety valves and safety relief valves shall be located in the top or side of the boiler. See Section IV HG-701
- Coil or header type boilers shall have the safety valve or safety relief valve located on the steam or hot water outlet end. See Section IV HG-701
- Safety valves and safety relief valves shall be installed with their spindles vertical. See Section IV HG-701
- The opening or connection between the boiler and any safety valve and safety relief valve shall have at least the area of the valve inlet. See Section IV HG-701
- Safety valves and safety relief valves shall not be connected to an internal pipe in the boiler. See Section IV HG-701.4
- No shutoff of any description shall be placed between the safety or safety relief valve and the boiler, or on discharge pipes between such valves and the atmosphere. See Section IV HG-701.5
- A discharge pipe shall be used. Its internal cross-sectional area shall be not less than the full area of the valve outlet. See Section IV HG-701.6

- The discharge from safety or safety relief valves shall be so arranged that there will be no danger of scalding attendants. See Section IV HG-701.6
- The safety valve discharge shall be as short and straight as possible and so arranged as to avoid undue stress on the valve. See Section IV HG-701.6
- Hot water heating or supply boilers limited to a water temperature of 210°F may have one or more officially rated temperature and pressure safety relief valves installed. If additional valves are used they shall be temperature and pressure safety relief valves. See Section IV HG-701.7
- When the temperature and pressure safety relief valve is mounted directly on the boiler with no more than 4 in. maximum interconnecting piping, the valve may be installed in the horizontal position with the outlet pointed down. See Section IV HG-701.7
- Provisions shall be made for the expansion and contraction of hot water mains connected to boilers by providing substantial anchorage at suitable points and by providing swing joints when boilers are installed in batteries. See Section IV HG-703.1
- Makeup water may be introduced into a hot water boiler through the piping system or through an independent connection. See Section IV HG-705
- The water flow from the independent connection shall not discharge directly against parts of the boiler exposed to direct radiant heat from the fire. See Section IV HG-705
- The makeup water pipe shall be provided with a check valve near the boiler and a stop valve or cock between the check valve and the boiler or between the check valve and the piping system. See Section IV HG-705
- In lieu of a check valve in the makeup water line, a back flow preventive device may be used if the device's minimum pressure rating is equal to the pressure stamped upon the boiler, and the temperature rating of such device including all internal components is not less than 250°F. If the back flow preventer does not meet these requirements a check valve shall be installed in addition to the back flow preventer. See Section IV HG-710
- On closed heating systems an expansion tank shall be installed that will be consistent with the volume and capacity of the system. See Section IV HG-709
- Expansion tanks for systems designed to operate above 15 PSI shall be constructed in accordance with ASME Section VIII, Division 1.
- Provisions shall be made for draining the tank without emptying the system, except for pre-pressurized tanks. See Section IV HG-709
- For single hot water heating boilers stop valves shall be located at an accessible point in the supply and return pipe connections as near the boiler nozzle as is convenient. See Section IV HG-709
- When the boiler is located above the system and can be drained without draining the system, stop valves may be eliminated. See Section IV HG-709
- A stop valve shall be used in each supply and return pipe connection of two or more boilers connected to a common system. See Section IV HG-710.3

- The minimum pressure rating of all valves or cocks shall be at least equal to the pressure stamped upon the boiler, and the temperature rating of such valves or cocks including all internal components, shall be not less than 250°F. See Section IV HG-710.4
- Each hot water boiler shall have one or more drain connections, fitted with valves or cocks connecting to the lowest water containing spaces. See Section IV HG-715
- The minimum size of the drain piping, valves, and cocks shall be ¾ inch. The discharge piping shall be full size to the point of discharge. See Section IV HG-715
- All cast iron hot water boilers shall be provided with washout openings to permit the removal of any sediment. Washout plugs shall not be smaller than NPS 1 ½ inch for boilers having gross internal volume more than 5 cu ft. Washout plugs shall not be smaller than 1 inch for boilers having gross internal volume not more than 5 cu ft. See Section IV HC-325

Note: Make certain that all items listed above are in compliance prior to requesting an inspection on a new or reinstalled boiler.